

# Matrix Addition and Scalar Multiplication

## Identity Matrix

$$I_3 = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

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## Matrix Addition and Scalar Multiplication

Matrix Addition and Scalar Multiplication is the same stuff you have done for [Row Reduction](#)

An example:

For example, if

$$\begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{pmatrix} + c \begin{pmatrix} 7 & 4 & 7 \\ 0 & 0 & k \end{pmatrix} = \begin{pmatrix} 15 & 10 & 17 \\ 4 & 5 & 16 \end{pmatrix}$$

What are the values of  $c$  and  $k$ ?

$$\begin{aligned} 1 + c7 &= 15 \\ c &= 2 \\ k &= 5 \end{aligned}$$

Some obvious properties,

If  $r, s \in \mathbb{R}$  are scalars, and  $A, B, C$  are  $m \times n$  matrices, then

1.  $A + 0_{m \times n} = A$
2.  $(A + B) + C = A + (B + C)$
3.  $r(A + B) = rA + rB$
4.  $(r + s)A = rA + sA$
5.  $r(sA) = (rs)A$